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History and current status of the motor vehicle energy labeling and its implementation possibilities in Malaysia

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ABSTRACT

The road transport and particularly the passenger cars are responsible for increasing the share of transport energy consumption and harmful emissions level growth. The fuel economy label is an informative tool to influence customers and manufacturers to put special care to the energy efficiency issue. The implementation of fuel economy label for motor vehicles in Malaysia will prevent the up going trend of petroleum consumption which will be beneficial to consumer and society. As a consequence, the harmful greenhouse gas (GHG) emissions that are the main causes of the global warming and air pollution will be reduced. Studies in developed countries show that implementing the fuel economy label is beneficial for society, government and the environment. This paper focused on a review of international experiences on fuel economy label. It also attempts to discuss about the energy savings possibilities that lead to reduce GHG emissions by implementing the program. The last but not least recommendation is the fact that the sooner the fuel economy label applies for the passenger cars in Malaysia will be more beneficial for the country.

Contents

1. Introduction

The global warming and air pollution facing the world today is getting worse more and more. Therefore, there has been a growing concern recently about energy use and its adverse impact on the environment all over the world [1–6]. The transportation sector is the most significant sector that accelerates environmental degradation among other. The negative impact of transportation on the environment is widely known and discuss deeply in many countries as presented in details in Refs. [7–21]. As an emerging economy country, Malaysia is not exempted from this environmental degradation. During the last three decades, the motor vehicle usage has increased rapidly in this country together with increasing income per capita [22–26], and it is predicted to grow much higher in the future [27–32]. In order to reduce the energy consumption

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Fig. 1. Environmental Protection Agency (EPA) endorsement label.



Fig. 2. Sample of dial label.

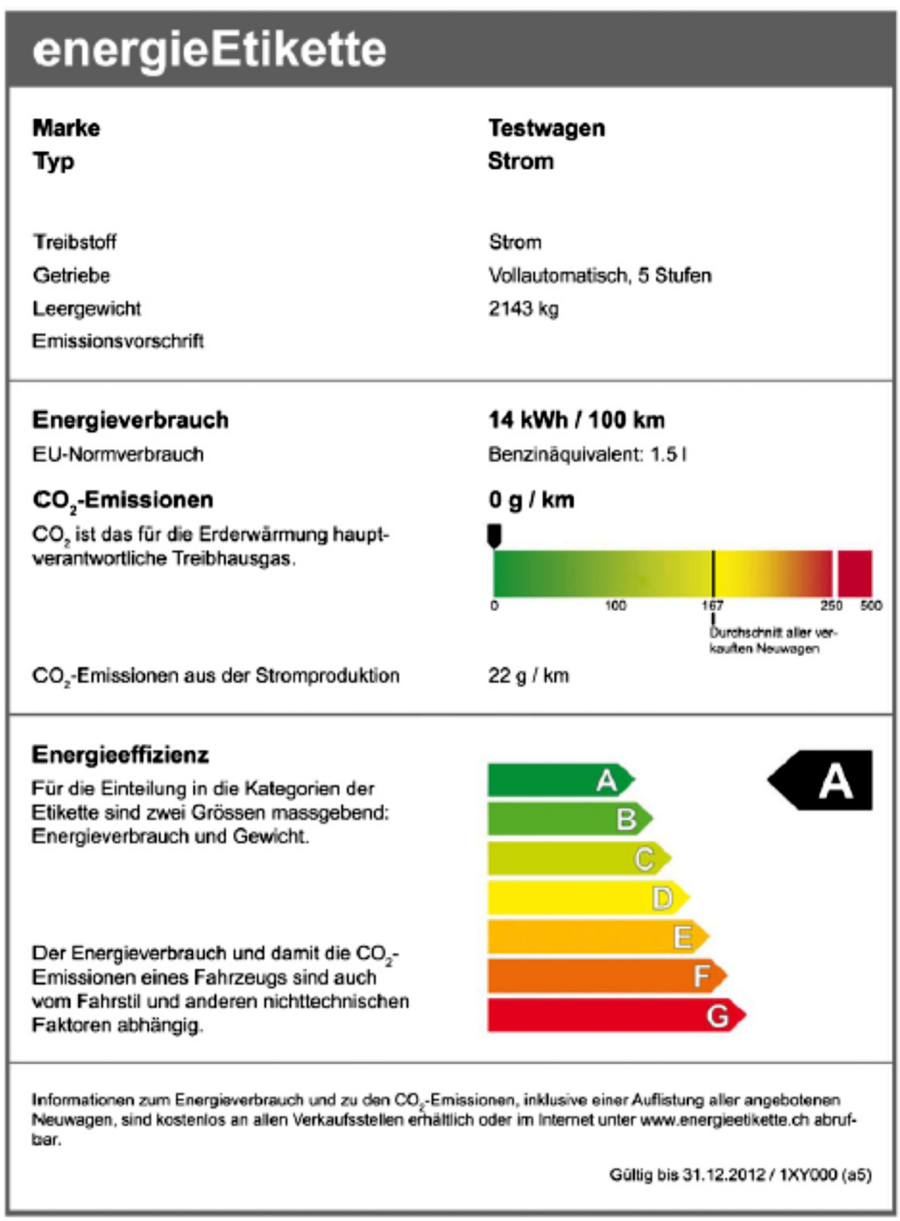


Fig. 3. Sample of bar label.

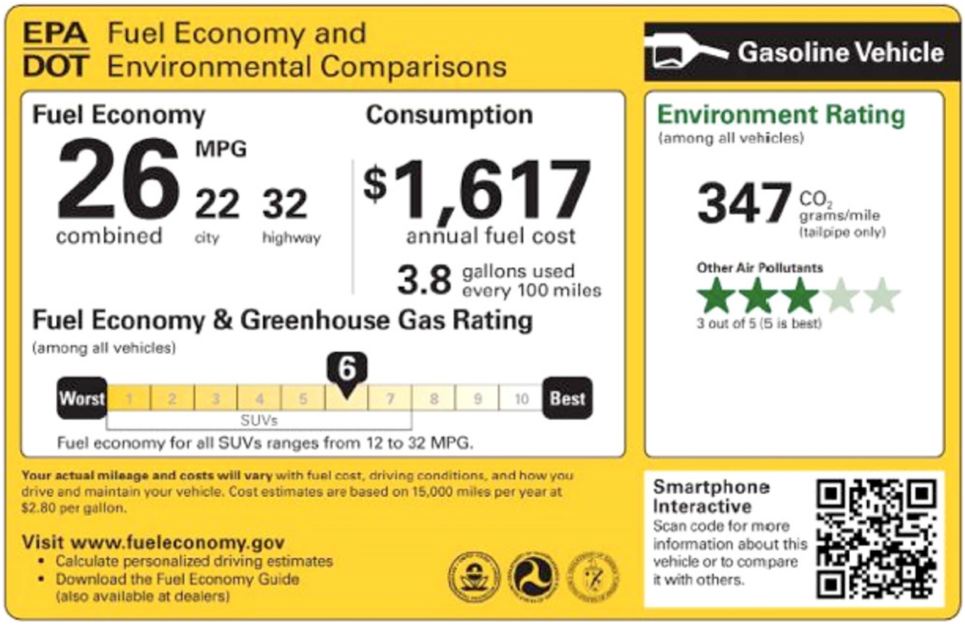


Fig. 4. Sample of linear label.

and emissions in the transportation sector, the government considers adopting the strategy that can control energy growth in the near future. One of the most popular strategies to save energy consumed in motor vehicles and to educate customers to use fuel efficiently is to implement the fuel economy label [33–44]. The program has been successfully implemented in some developed countries but the initiative cannot be directly reproduced in the developing countries because of the differences and uniqueness of the manufacturing structure, energy policies, infrastructure and climates condition. There are a few countries that have failed to implement the program while others have used it successfully, some of related papers in the subject presented by Refs. [45–55]. Some of the experiences of the developed countries can be directly adopted, but some others must be modified in order to make the program compatible with the developing country.

Fuel economy standards are more focused on the technical parameters of energy efficiency while the fuel economy labels are employed to make the customers aware of the relative efficiencies of various models of vehicles. Some works related to technical parameters of fuel economy standard are given in Refs. [56–62] while some of the works related on fuel economy labeling are discussed by Refs. [63–69]. By this means fuel economy labels will bring competition between car manufactures and they can acts as an indicator telling the potential buyer how efficient the car is. By defining appropriate label, the car with the best fuel economy and most competitive price, is more likely to be sold in large numbers. Labels are not only to set a guideline of efficiency that manufactures should follow, but also they can encourage them to improve their product while preserving their price low enough to win the market. Some fuel economy labels indicate the operating costs of the model over a certain period of time, usually one-year. Others display the fuel consumption rate of the vehicles. Overall, the most important aspect of fuel economy labels is to provide a procedure for the customers to compare the performances of similar type of vehicles. It has been done in some cases by showing the fuel consumption of a particular model on a scale and it shows the lowest and highest fuel consumption models. The labels usually displayed on the wind screen of each vehicle so that the costumers get the information during procurement. Some other related works on fuel economy standards and labels around the world are discussed in detail by Refs. [70–90].

Disregarding the fact of dismissing fuel resources at a significant rate is against the goal of achieving sustainable society. Hence, radical steps should be taken to ensure efficient implementation of the energy efficiency program around the world. In the history of development economics, the fuel economy label has been thought as a key factor in indicating efficiency. It is apparent from statistical data, that passenger cars are the largest vehicle categories. Therefore, one of the effective strategies to improve the efficient use of energy is to implement the fuel economy label for passenger car [87,91–95]. Based on the author's knowledge there is no specific studies have been conducted on comparing and history of fuel economy labeling. Therefore, this paper attempts to present a review on history and current status of the motor vehicle energy labeling and its implementation possibilities in Malaysia that can be used as a source for further policies and authority in this country as well as in other developing countries.

2. Fuel economy labels

Fuel economy label is a mandatory or voluntary sticker that is affixed to the car containing information of the vehicle's fuel consumption. Fuel economy label is a tool to make customers and manufacturers to put more emphasis on energy efficiency. Therefore, the objective of introducing labels is to convince the customer to buy and the manufacturers to produce more fuel efficient vehicles.

2.1. The purpose fuel economy label

There are multiple benefit of implementing fuel economy labels, however the most striking benefits of the program are to [96,97]:

(i) Encourage customer to select the most efficient vehicles that meets their requirements.
(ii) Enable customers to take into account the operating cost and the life cycle cost of the vehicle.

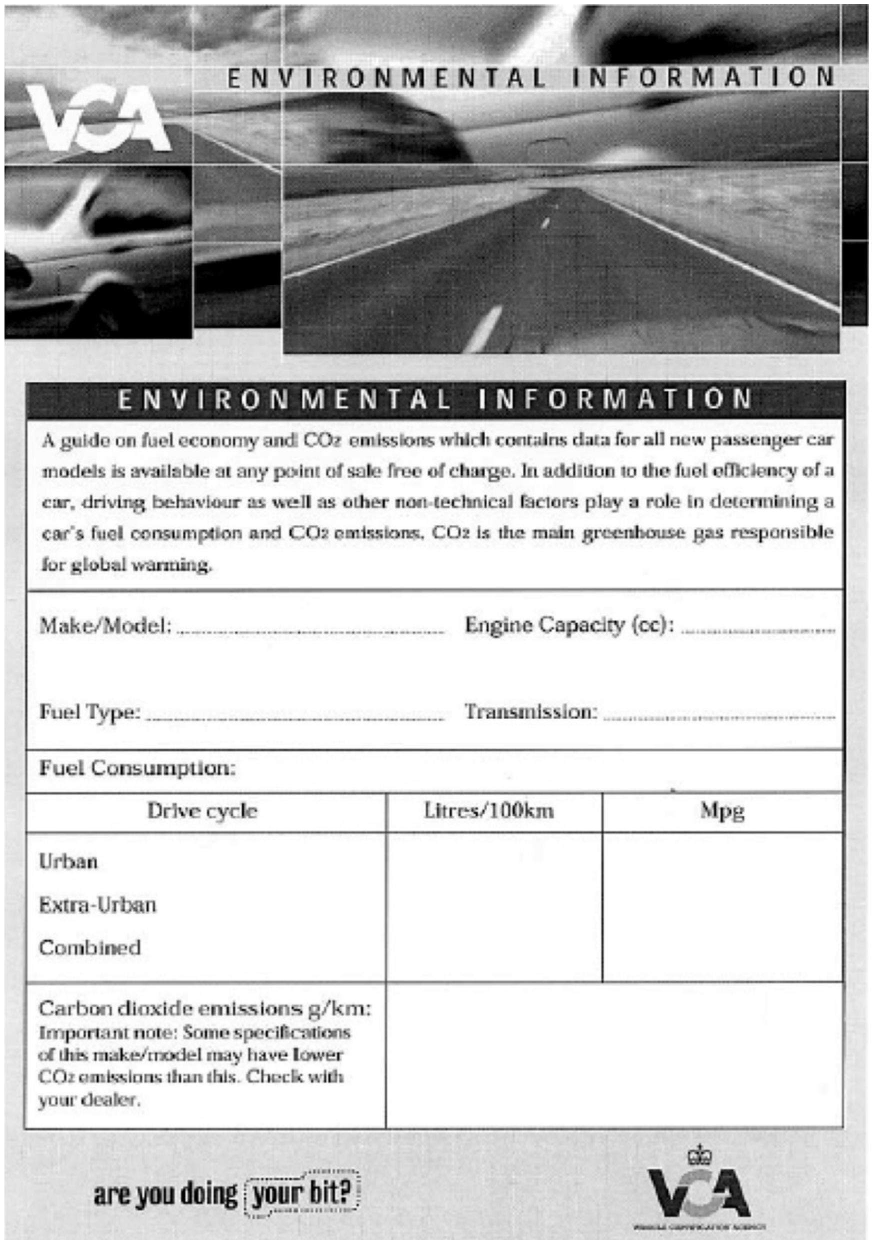


Fig. 5. Information only label.

(iii) Encourage the manufacturers and importers to improve the efficiency of the vehicle and to make sure efficient vehicle share available in the market.
(iv) Increase awareness of fuel consumption and emissions that will influence the potential buyer.
(v) Influence motor vehicle manufacturers to gradually improve fuel economy of newly produce vehicles.
(vi) Provide a pool of more efficient vehicle in the market by label grading mechanism.

2.2. Fuel economy label categories

Generally, there are three main categories of energy label used in various countries, those are [98]:

(i) *Endorsement label* offers a seal of approval that a vehicle should meets certain pre-specified criteria. The purpose of endorsement label is to indicate clearly that the labeled vehicle use energy more efficient compared to others in the market. These labels are generally based on a 'yes-no' cutoff and offer little additional information. The Energy Star, which is introduced with joint administered of US Environmental Protection Agency (EPA) and US Department of Energy is one example of endorsement labels. The sample of endorsement label is presented in Fig. 1 [99].
(ii) *Comparative labels* allow customers to compare energy consumption among available models in order to make an informed choice. A comparative label can fall into two subcategories; (i) categorical ranking system, (ii) continuous scale or bar graph to show relative energy use. The categorical label uses a ranking system that helps the customer to compare the fuel economy of different vehicle models. The main emphasis is on establishing clear categories so that the customers can easily compare the fuel economy of the vehicle with others by just looking at a single label. The continuous scale label provides comparative information that allows customers to

Table 1
History of fuel economy labeling.

No.	Country	Year	Note
1.	Australia	1th January 2001	
2.	Brazil	November 2009	
3.	Canada	1998	
4.	Chile	Voluntary beginning 2011, Mandatory September 2011	
5.	China	2009	
6.	California	1978	California smog index label
7.	Denmark	1th January 2000	
8.	Europe	18 January 2001	EU-Directive (Directive 1999/94/EC adopted)
9.	India	Voluntary in 2010, Mandatory after 2011	
10.	Japan	April 2004	
11.	New Zealand	7 April 2008	
12.	Sweden	1977/1978 (there are two version in web)	See at file Rep. Korea
13.	Singapore	Voluntary 2003, Mandatory 1 April 2009	
14.	South Africa	1 July 2008	
15.	Republic of Korea/South Korea	Rep. Korea (1992) – after separate become S. Korea, they enacted fuel efficiency information in 2005	For info see at file Rep. Korea
16.	Thailand	2005	
17.	U.S.A.	1975	
18.	U.K.	1983	

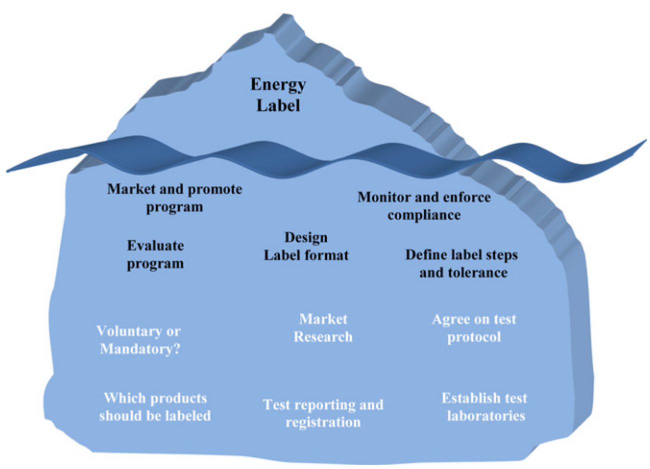


Fig. 6. The 'iceberg' of energy labeling.

choose between models but do not use specific categories. Basically, the visual design of comparative labels can be divided into three categories [100]:

(a) *Dial label*: This type has a 'dial' or 'gauge', with a greater fuel economy linked to advancement along the gauge (more fuel economy represented by a clockwise arc). The number of stars or the numerals grading on the scale depends on the highest preset threshold for energy performance that the model is able to meet. The sample of dial label is given in Fig. 2 [101].
(b) *Bar label*: This type of label uses a bar chart with a grading from best to worst. All grade bars are visible on every label with a marker next to the appropriate bar indicating the grade of the model. The sample of bar label is presented in Fig. 3 [102].
(c) *Linear label*: This label has a linear scale indicating the highest and lowest energy use of models in the market, locating the specific model within that scale. The sample of linear label is presented in Fig. 4 [103].

(iii) The *information only* label, provides information on the technical performance of a single labeled product and offers no simple way (such as ranking system) to compare fuel economy performance between vehicles. The sample of information only label is given in Fig. 5 [104].

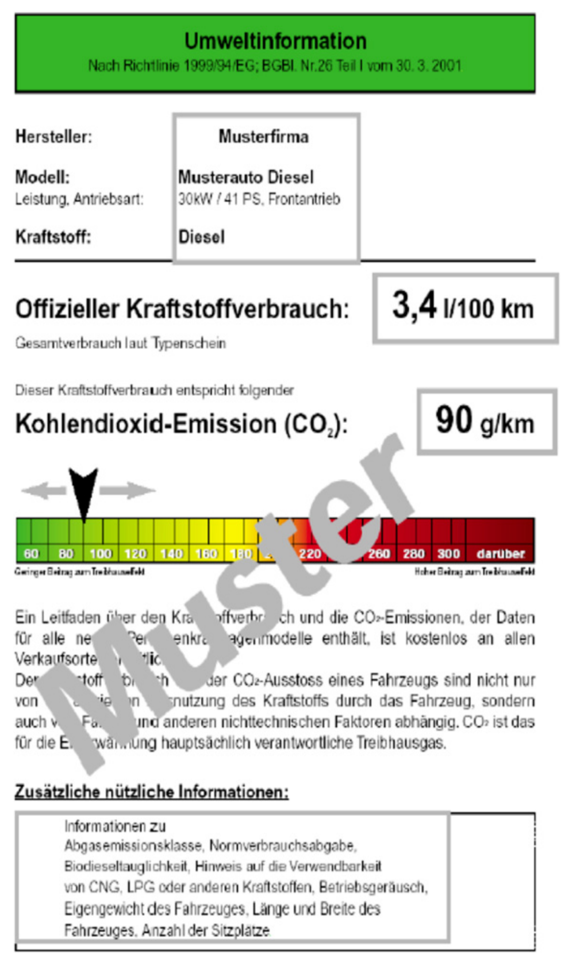


Fig. 7. Austrian fuel economy label.

2.3. Benefit of fuel economy label

The benefits of fuel economy label can be observed when the program is well designed and implemented. Some of the beneficial consequences and advantages of using the labels can be classified as follows [98]:

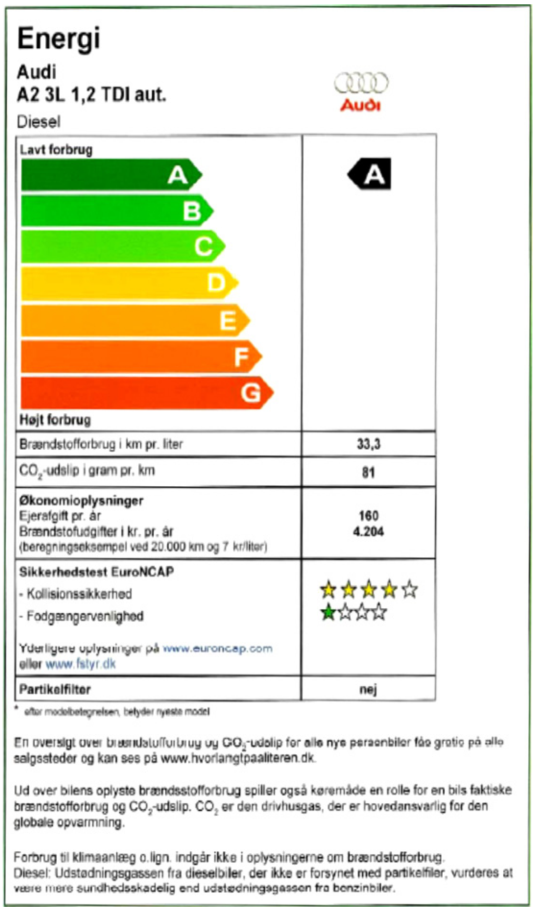


Fig. 8. Denmark categorical bar type comparative label.

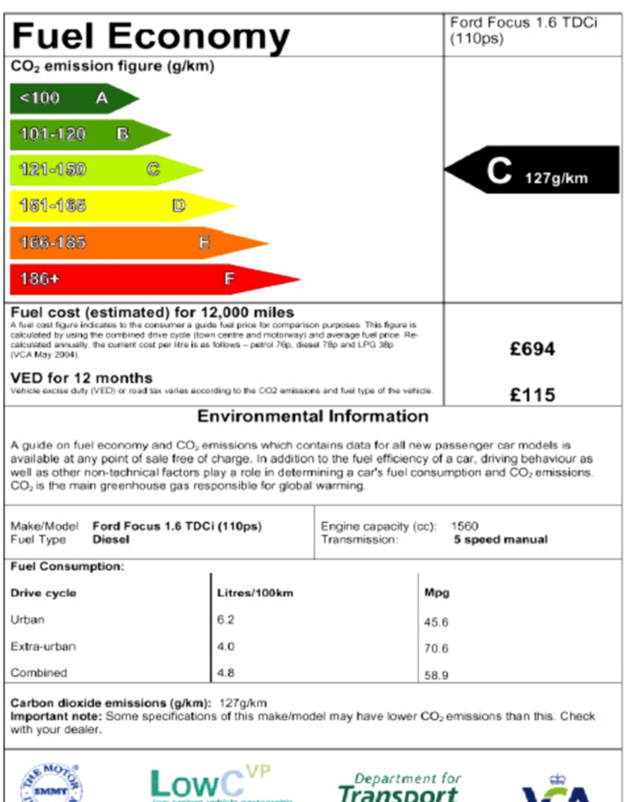


Fig. 9. U.K. fuel economy label.

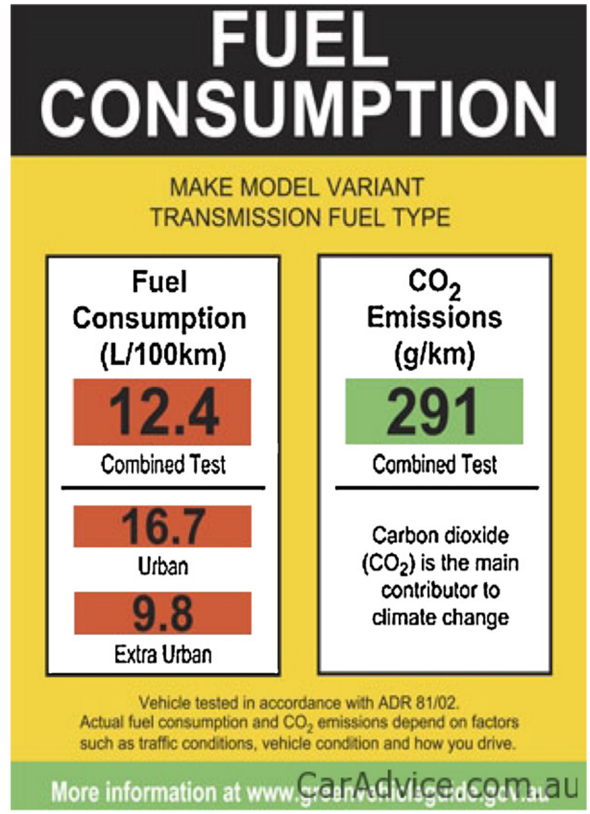


Fig. 10. Australia fuel consumption label.

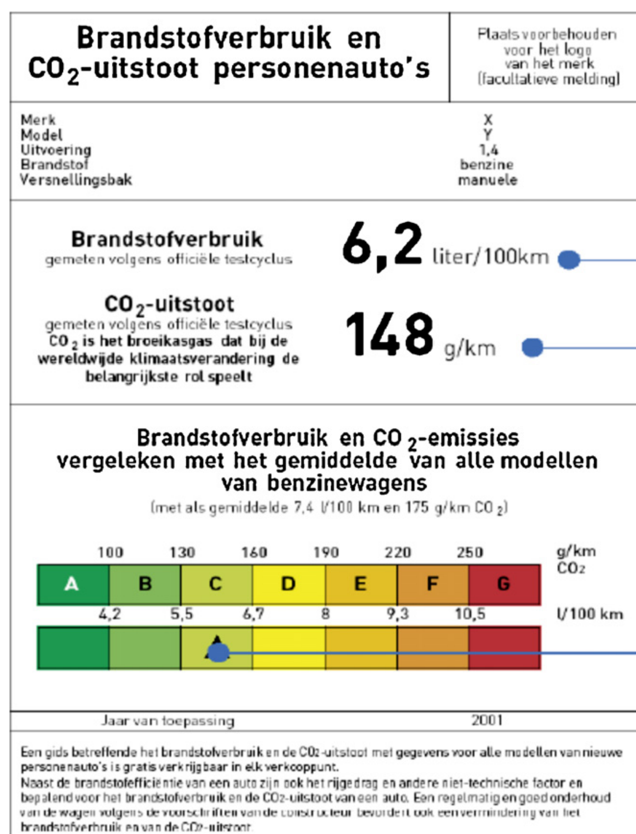


Fig. 11. Belgium fuel economy label.

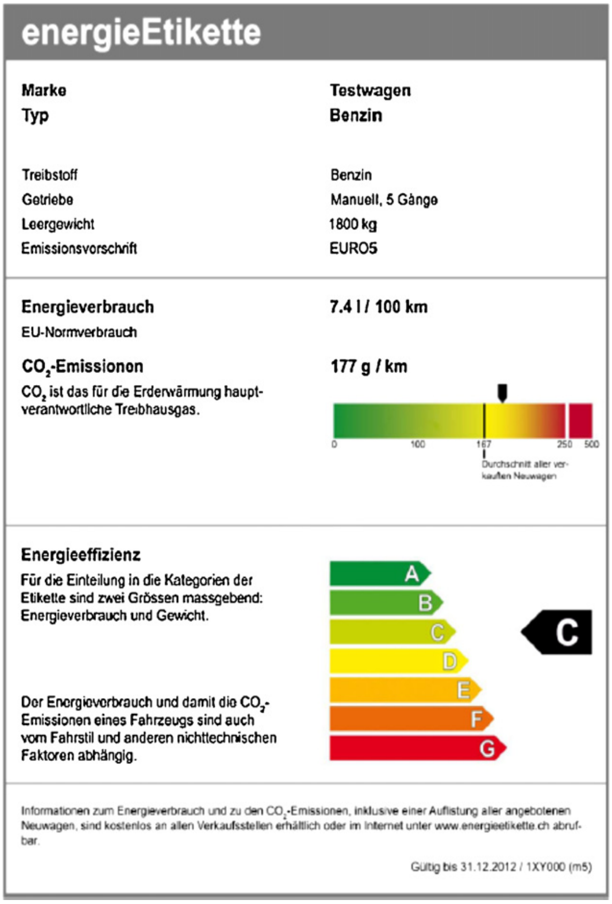


Fig. 12. Switzerland endorsement label.

(i) they will result in significant amount of fuel savings and emissions reduction;
(ii) they are cost effective tools that are very useful to reduce energy growth without reducing economic growth;
(iii) they can shift the manufacturers, consumers and public behavior toward a more efficient use of energy;

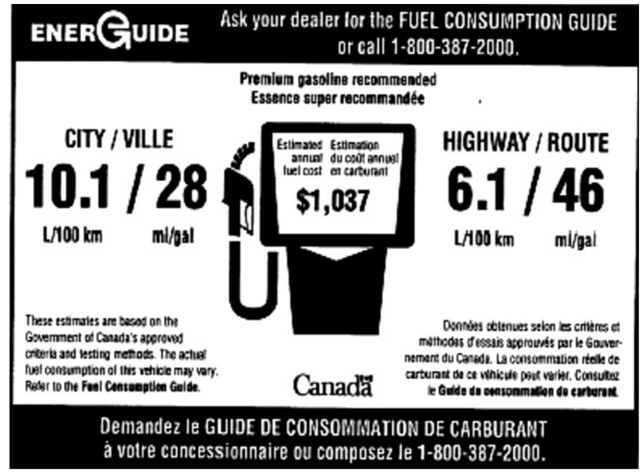


Fig. 13. Canada information-only type comparative label.

(iv) they can treat all manufacturers, distributors, retailers equally; and finally,
(v) they can result in energy savings that are comparatively measure and can be verified.

Therefore, by introducing an appropriate label, motor vehicles with the best efficiency ratings and most competitive price are more likely to be sold in large numbers. And consequently, inefficient or and less efficient vehicles will be slowly removed from the marketplace, and this will encourage the development of more cost and energy efficient technologies. The fuel economy label shifts the distributions of energy efficient vehicles upwards by providing information for customers to make rational purchase decisions and motivate manufacturers to produce vehicles with higher energy ratings.

The fuel economy label is not only to set a guideline of fuel economy ratings that manufacturers should follow but also to promote the awareness to customer toward purchasing higher fuel economy rating vehicles. It also encourages manufacturers to produce more efficient vehicles. Therefore, fuel economy label is an inexpensive gauge to change consumer behavior and simultaneously pull market transformation by encouraging motor vehicle manufacturers to produce vehicles with a better fuel economy [105].

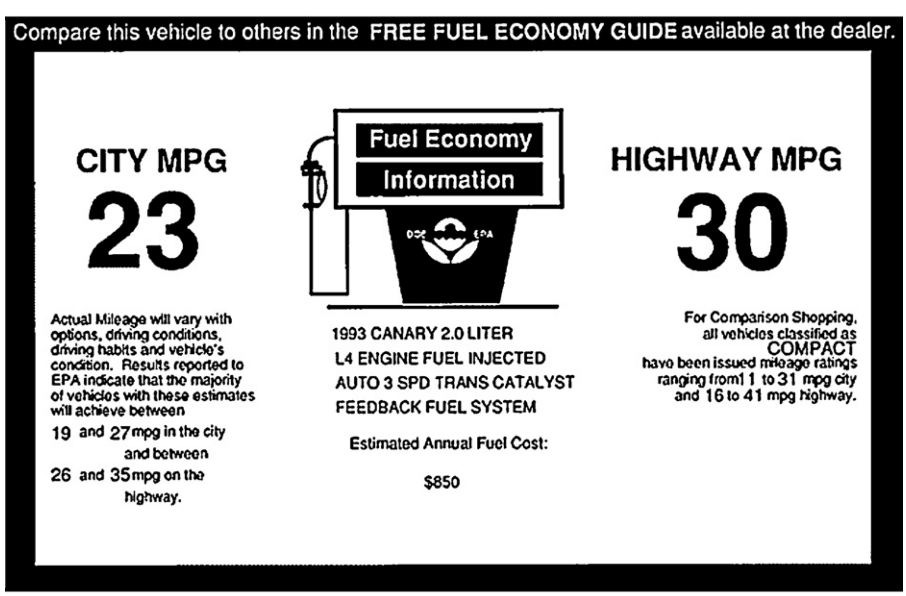


Fig. 14. U.S. fuel economy label.

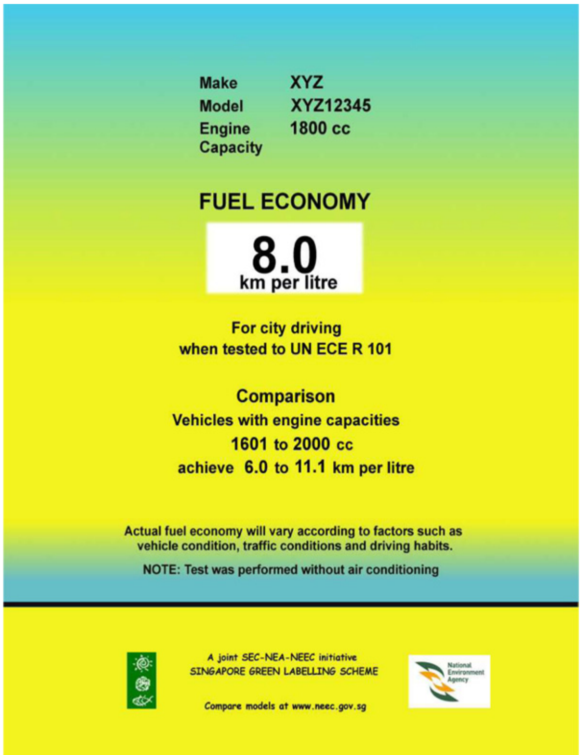


Fig. 15. Singapore fuel economy label.

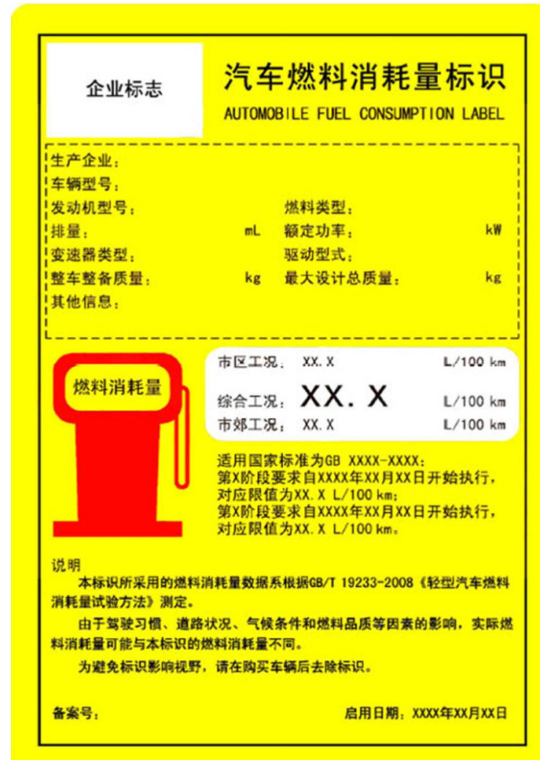


Fig. 17. China fuel consumption label.

From the consumer's point of view, the label itself is the most important element of the whole scenario. Hence, the label design is the most important part of the whole program. It must convey information for general public in a way to understand easily and assist the customer with purchase decisions. The energy label that appears on a motor vehicle is the peak of an elaborate infrastructure of elements and activities that are the foundation of an energy-labeling program. The position of fuel economy labels is at the peak of other related energy efficiency programs. The so called iceberg of energy labeling program is presented in Fig. 6. [98].

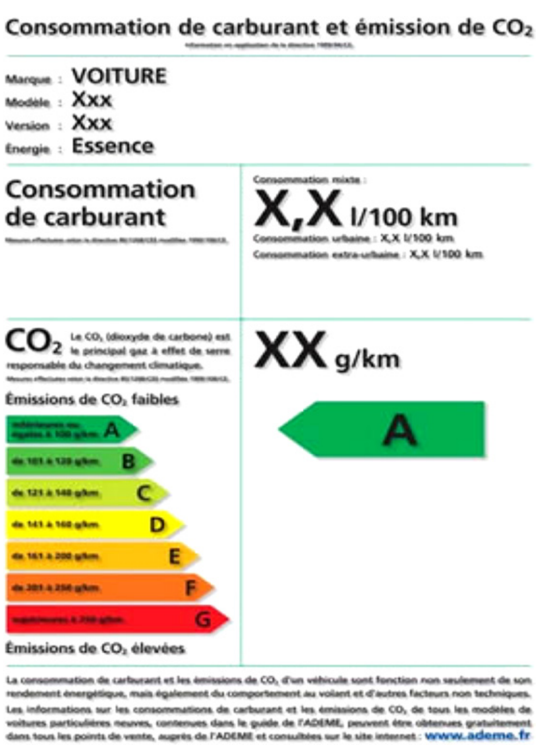


Fig. 16. France fuel consumption label.

2.4. Legal status of the label

Fuel economy label can be either mandatory or voluntary in nature. Mandatory labels, prescribed for all of the vehicles in categories, must be affixed by fuel economy labels when it sells in the market. Selling vehicles without a fuel economy label or removal of the label before customer purchase is considered against the law. The label prepared by the authority is subjected to country law. On the other hand, a voluntary fuel economy label is an alternative option. Under voluntary energy labels, only some vehicles, with the agreement of the manufacturers, who agree to carry labels, will



Fig. 18. New Zealand fuel economy label.



Fig. 19. Chile fuel economy label.



Fig. 20. Japan fuel economy label.

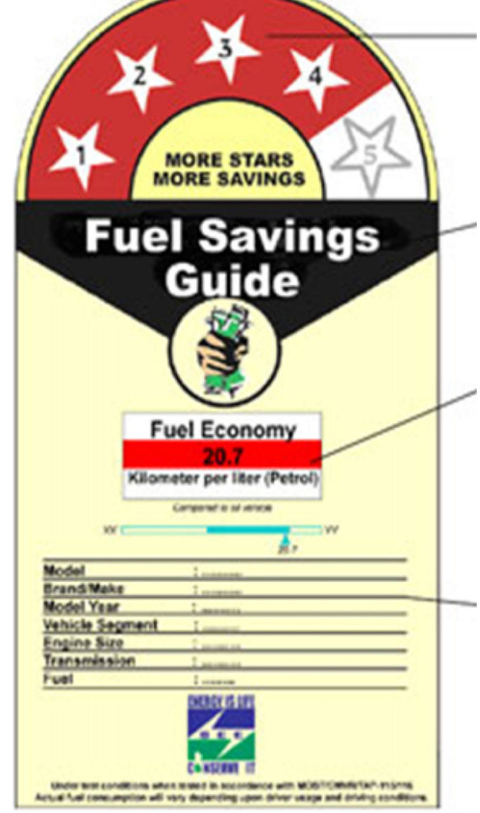


Fig. 21. India fuel economy label.



Fig. 22. Finland fuel economy label.

have labels affixed. This is established by negotiation between the government authority and manufacturers. They have the merit of being less controversial and, hence, somewhat easier to be implemented. However, a voluntary label does not work effectively in many countries.

3. History of energy labeling

It is more than four decades that energy efficiency standard and label are exists, but they were highly taken into account just after

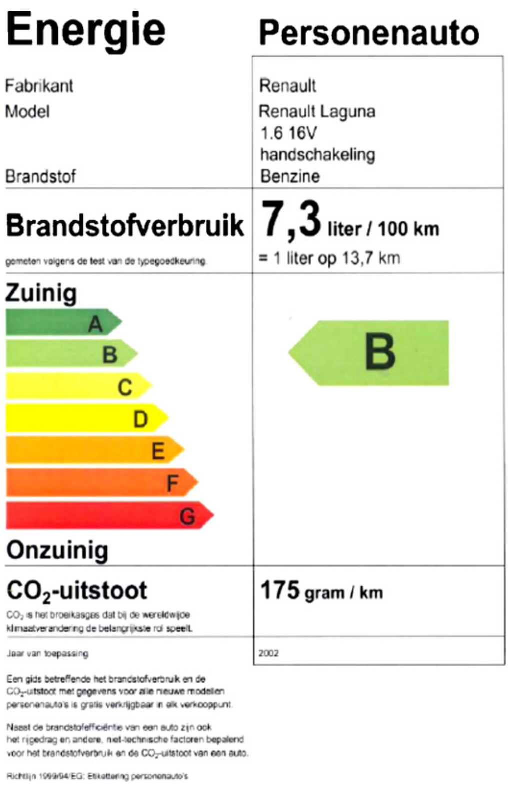


Fig. 23. Netherlands fuel economy label.



Fig. 24. Portugal fuel economy label.

oil price shock in the 1970s. They are still debating on the origin of energy efficiency standards and labeling. The United States and European countries claimed that they are the first countries that implemented energy efficiency standards label for products. According to Egan [106], United States is the nation with the first energy label programs as far back since 1975. Boardman et al. [100] states that European countries are among the first in introducing legislation to limit the energy consumption of motor vehicles. Car



Fig. 25. Germany fuel economy label.

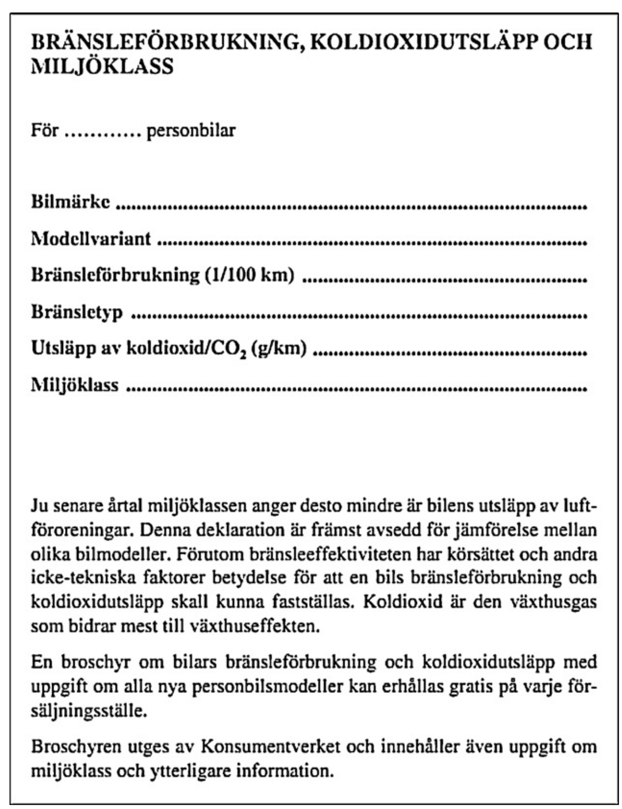


Fig. 26. Sweden fuel economy label.

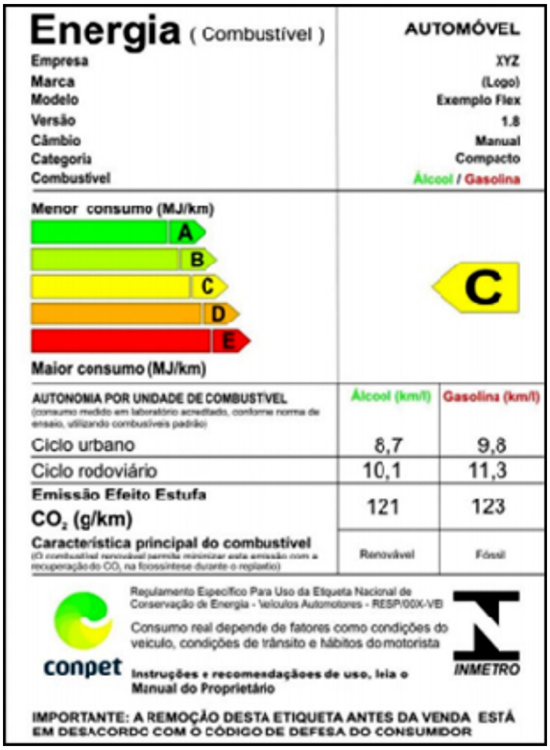


Fig. 27. Brazil fuel economy label.



Fig. 28. South Korea fuel economy label.



Fig. 29. Thailand fuel economy label.

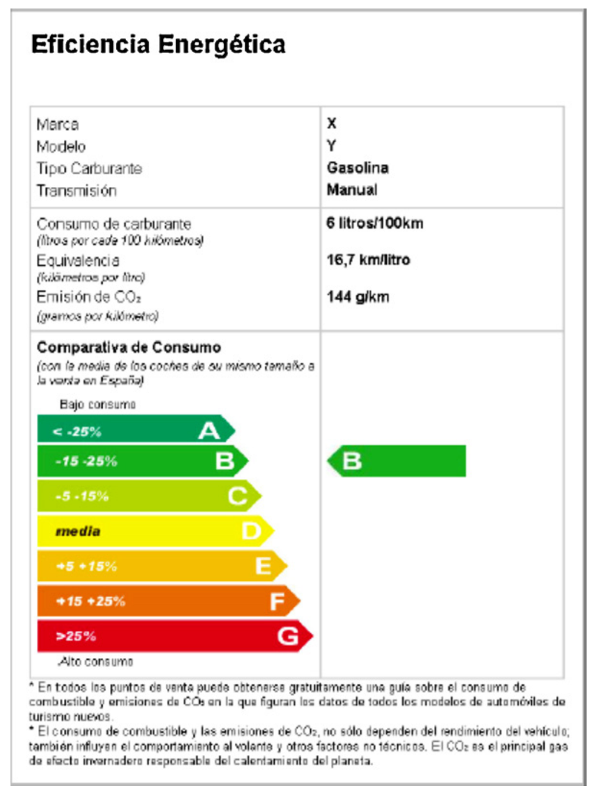


Fig. 30. Spain fuel economy label.

labeling schemes were in existence for several years since 1975 in Sweden and since 1983 in United Kingdom. In European countries, the high oil prices and rising fuel price have leads to drastic change in new energy efficiency policy. The fuel economy label design was originally derived from energy labels for household electrical appliances used to enable the customers to differentiate the ranking based on energy efficiency. If the customers are aware of the appliances label, they probably will recognize the fuel economy label as energy performance of the vehicle. Most of the countries have selected a comparative label for implementing the program; therefore, it is useful to review the format of similar energy labels that are currently being used in most countries around the world. The history of fuel economy label is given in Table 1.

4. Fuel economy label in selected country

Fuel economy label has been successfully implemented around the world especially in developed countries. In this subsection successful implementation of the program in selected countries and type of label selected will be elaborated. In Austria, the Austrian Energy Agency (EVA) in cooperate with the Federal Ministry of Environment and the Federal Ministry of Science and Transport used the categorical bar type of comparative label. In Denmark, the fuel economy label scheme is administered by the Danish Energy Agency (DEA) in the Ministry of Environment and Energy. Besides, in United Kingdom, the Vehicle Certification Agency (VCA) is responsible to manage the label scheme of the country. The

Table 2
Fuel economy labeling schemes in selected countries.

	Austria	Australia	Belgium	Canada	Denmark	Netherlands	Sweden	Switzerland	USA
Planned or Existing	Planned	Planned	Planned	Existing	Planned	Planned for attachment to cars-existing on website	Existing	Planned. Temporary label in meantime	Existing
Scope	As directive	Passenger cars, maybe extension to light commercial vehicles, 4 × 4	As directive	New cars, vans, light duty trucks	As directive	As directive	All passenger cars	As directive	New cars, vans, light duty trucks
Introduction date	As directive	2000	As directive	1998	1 January 2000	As directive	1977	As directive but temporary label prior to that	1975
Mandatory?	Yes	Yes	Yes	No	Yes	Yes	No	No: Temporary	Yes
Units of consumption	L/100 km	L/100 km	L/100 km	L/100 km; mpg	mpg	L/100 km	L/100 km	Not shown; L/100 km in guide	mpg
Comparison by absolute measure or relative scale	Relative by size and sales weighted	Absolute but perhaps label changed to appliance star style (relative)	Relative by size and sales weighted	Absolute	Absolute comparing all cars	Relative by size and sales weighted	Absolute	No scale shown but “efficient” designation with sales weighted comparison for all same weight	No scale but range of consumption shown for cars of same size
Comparison parameter	Width × length	None	Width × length	None	None	Width × length	None	Weight	Size class
Other measures of consumption	As directive	None	As directive	Annual fuel cost (focus of label)	Krona/year Krona/20,000 km Krona/60,000 km	Cost/50,000 km Cost/liter	None	None	None
CO_2	Intention to include values	No	As directive	No	Yes (g CO_2/km)	Yes (g CO_2/km)	Yes (g CO_2/km)	Not shown but in guide (g/km)	No – intended for the guide
Environmental ranking	No	No	No	No	No	No	Yes, ranking 1 to 3	No	In guide by ACEEE
Printed guide	Intended	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Online guide	Intended	Yes	Yes	Yes	Intended	Yes	Yes	Intended	Yes
Fiscal integration	Yes – with fuel consumption tax (No VA)	No	Intended	No	Yes with fuel consumption tax (green owner)	Yes with *relative* consumption	With enviro. rating	Intended – either to CO_2 or fuel consumption	
New cars sold to fleet buyers	15% maximum	10–15%	–	10%	–	10%	–	<5%	10%

Table 3
Fuel economy labeling and GHG standards around the world.

Country/region	Standards	Measure	Structure	Targeted fleet	Test cycle
Australia	Fuel	L/100 km	Single standard	New	NEDC
California	GHG	g/mile	Vehicle class-based	New	U.S CAFE
Canada	GHG	5.3 Mt reduction	Vehicle class-based	New and in-use	U.S CAFE
China	Fuel	L/100 km	Weight-based	New	NEDC
EU	CO_2	g/km	Single standard	New	NEDC
Germany	Fuel and CO_2	km/L and g/km	Single standard	New	NEDC
India	Fuel	km/L	Engine size-based	New	U.S CAFE
Japan	Fuel	km/L	Weight-based	New	JC08
Pakistan	Fuel and CO_2	L/100 km and kg/km	Engine size-based	New and in use	JC 10–15
South Korea	Fuel	km/L	Engine size-based	New	U.S EPA City
Singapore	Fuel and CO_2	km/L and g/km	Vehicle class based	New and in use	JC08
Sweden	Fuel	L/100 km	Vehicle class based	New and in use	U.S CAFE
Taiwan	Fuel	km/L	Engine size-based	New	U.S CAFE
US	Fuel	mpg	Single standard for cars; size-based for trucks	New	U.S CAFE

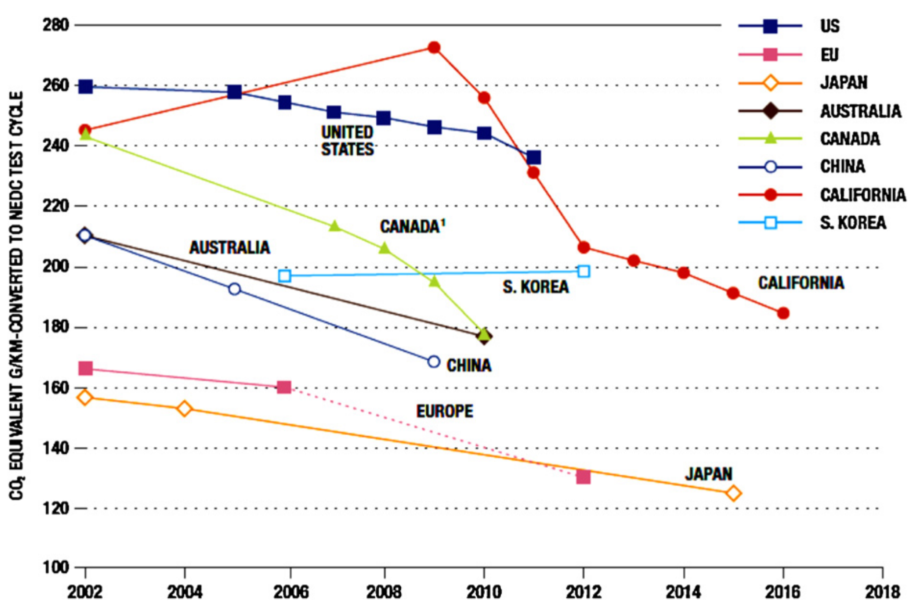


Fig. 31. Comparison of international fuel economy and GHG Standards emission.

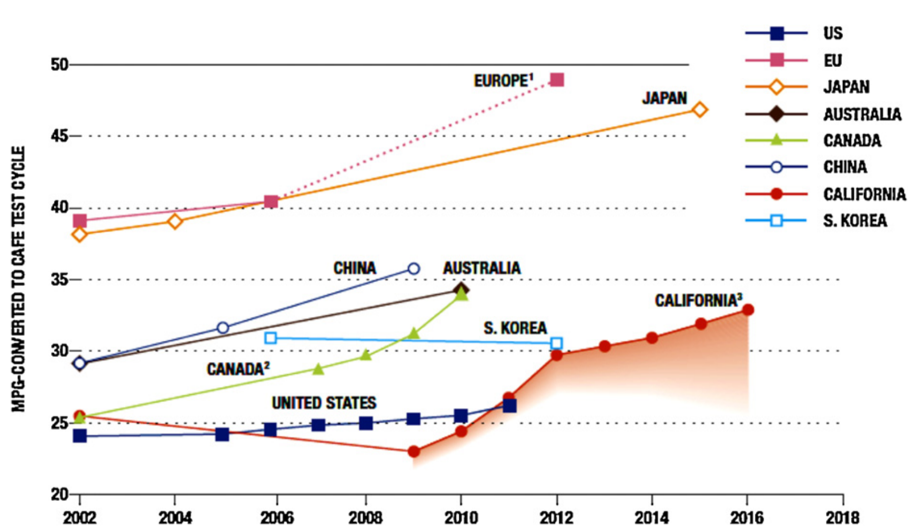


Fig. 32. Comparison of international fuel economy and GHG Standards emission.



Fig. 33. Map of Malaysia.

samples of the type comparative labels in Austria, Denmark and United Kingdom are presented in Figs. 7–9, respectively [107].

The sustainable transport team at the Australian greenhouse office produced an information type comparative label. The label indicates the vehicle fuel consumption in liters per 100 km and the carbon dioxide emitted by the vehicle per kilometer. The label is shown in Fig. 10 [104]. In Belgium, the Flemish Institute of technology research (VITO) with cooperation of the Belgian national government introduced information-only comparative type fuel economy label which indicates the fuel consumption of a vehicle in liters to travel 100 km and the amount of CO_2 emission in gram per km. This label is shown in Fig. 11 [104]. In Switzerland, the Swiss federal office of energy has administered a category bar comparative type of label. It is a simple label that acts as approval indicating the fuel consumption in liter per 100 km of the specified vehicle and its corresponding emission in gram per kilometers endorsed by the Swiss government. The label is presented in Fig. 12 [104].

The transport energy use division, office of energy efficiency, natural resources Canada (NRCan) and the federal government of Canada introduced an information only fuel economy label in 1998. The label shows an estimation of the annual fuel cost placed inside a fuel pump graphic as shown in Fig. 13 [104]. The label also gives absolute fuel consumption in liter per 100 km and mpg for the city and highway driving. The design of this label is similar to the United States label as presented in Fig. 14 [104].

In Singapore, due to the government concern on fuel consumption of road transport emissions associated with rapid growth of vehicle number, various energy efficiency programs and recommendations have been introduced to promote clean technology and to reduce the level of CO_2 and SO_2 emissions in order to protect the environment. The programs were announced and documented in the Singapore Green Plan [108]. The Singapore Green labeling scheme in association with the national environment agency administered the fuel economy labeling scheme for passenger cars in 2003. The sample of the Singaporean information-only comparative type fuel economy label is as shown in Fig. 15. The scheme is to raise consumer awareness of energy efficiency of the passenger car. The fuel economy labeling scheme for some other countries such as France, China, New Zealand, Chile, Japan, India, Finland, The Netherlands, Portugal, Germany, Sweden, Brazil, Korea, Thailand and Spain are presented in Figs. 16–30, respectively [102,104,109–116].

The fuel economy labeling and GHG standards around the world are presented in Table 2 [117]. Table 3 shows the fuel economy label scheme for several countries [100,104,117–120].

A number of different test procedure, baseline, and approaches to regulate fuel economy and GHG emission have been developed over the last several decades. The aim of fuel economy standards and labels are different in stringency depending on the priorities of the regulating body, their apparent forms and structures and by how the fuel economy or GHG emission levels of motor vehicles are measured by test procedure. Therefore, it needs the methodology to compare the existing fuel economy equally since different parts of the world use different type of test procedure in determine fuel consumption and GHG emission. An and Sauer [121] developed the methodology for directly comparing vehicle fuel economy in terms of European style (grams of CO_2 per kilometer) and US style (miles per gallon). A comparison of the relative stringency and implementation schedules of GHG emissions and fuel economy around the world is given in Figs. 31 and 32 [122].

5. Fuel economy label in Malaysia

The energy consumption by transportation sector alone in Malaysia is accounted for about 36% [123]. However, the country still yet to have fuel economy labels for motor vehicle. However, the Ministry of Energy, Telecommunications and Multimedia (METM) administer the energy commission to be responsible for the implementation of an energy efficiency program in the country. A voluntary energy label for refrigerators and freezers has been implemented in 2004. The label is a categorical dial type comparative labeling scheme. It has a square/rectangular base with a semi-circle or "dial" across the top. The "dial" resembles a speedometer or gauge, the further advanced the gauge is in the clockwise direction, the better the product. The number of stars or the "grading" numeral on the scale depends on the energy performance that the model is able to meet (there are five rankings). With the Malaysian government joining forces with United Nations Economics Commission for Europe (UNECE) in the global harmonization of automobile standards implementing WP53 label to car parts, thus, this study is in support of this program.

Malaysia is comprised of west Malaysia (Peninsular Malaysia) and east Malaysia (Sabah and Sarawak) with the total area of 330,242 km^2 with the breakdown presented as follows:

Peninsular Malaysia 131,703 km^2.
Sabah and Labuan 74,089 km^2.
Sarawak 124,450 km^2.
The map of Malaysia is given in Fig. 33 [124].

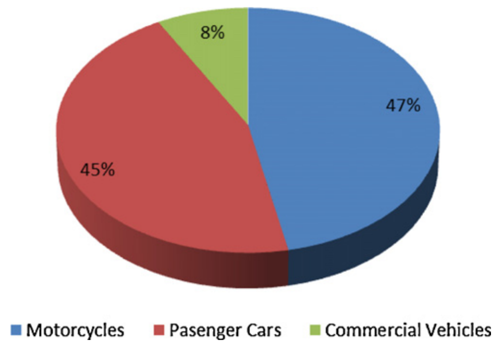


Fig. 34. The breakdown according to vehicle type.

According to the statistical data reported by the population and housing census 2011, the total population of Malaysia is around 28.63 million compared to 18.38 million in 1991 thus giving an average annual growth rate of 2.6% in the period of 1991 to 2000 [125,126]. After nearly a decade of strong economic growth (annually average of 8.7%), Malaysia experiences a hard hit by the regional financial crisis of 1997–1999. The economy suffered a sharp 7.5% contraction in 1998 but rebounded in 1999 to grow by 5.6% [127]. In the 40 years thereafter, Malaysia's economic had been one of the best in Asia's territory. The country developed the automotive sector to help reduce the economic dependency only on rubber and palm oil, and to avoid having a huge trade deficit, and as a platform for economic development [128]. The automotive market is dominated by national cars such as Proton and Perodua, and some 25 other manufacturers [76]. In Malaysia around 89% of vehicles use petrol and around 11% of them use diesel while the number of vehicle has an average annual growth rate of 9%. At the moment, there are about 20.2 million vehicles in this country with an approximate vehicle type breakdown presented in Fig. 34 [129].

In Malaysia, the inspection of new vehicles is subjected to the type approval inspection, which is conducted by examining the documentations submitted to Department of Environment (DOE) by the vehicle manufacturers or assemblers, and for in-use vehicles through periodical inspection, which is to be conducted at inspection centers [130].

Despite being self-sufficient in terms of oil and gas needs and being a member of the Association of South East Asia Nations (ASEAN), Malaysia has always given a high priority to oil security and emergency preparedness efforts. This explains Malaysia's commitment and ratification of the ASEAN Petroleum Security Agreement (APSA) 1986; it is very beneficial to introduce the fuel economy label for motor vehicles in Malaysia, in order to achieve the solution of being oil dependence which always ties in technological progress such as developing advanced vehicle technologies that use energy more efficiently. By taking an interest in the fuel economy label, it can help to reduce gasoline and diesel consumption growth in Malaysia, reduce GHG emissions, create jobs distribution widely across states, industries and occupations, providing awareness to customer to have decision power to purchase a vehicle with a higher fuel economy and create incentive for motor vehicle manufacturers to produce cleaner, and more fuel efficient vehicles in the future. The Malaysian government heavily influences the activities of the domestic automotive manufacturers and assemblers because as a developing country, Malaysia believes that a strong motor industry brings employment, technology and prestige [128]. Furthermore, many sectors in Malaysia will benefit from implementing this strategy. Therefore, this work aims to give an initiative for Malaysia and as well as to other developing countries to implement fuel economy label as soon as possible. A huge saving can be obtained while taking the advantage of advanced technologies [131,132]. With the implementation of fuel economy label for motor vehicles, consumers can be educated to have more information in purchasing decisions.

6. Conclusions

Nowadays, the information plays a vital role during purchasing selection and purchasing procedure. It is important for the potential buyer to obtain the accurate information before the purchase made. By introducing the fuel economy label, motor vehicles with higher energy ratings and most competitive price are more likely to be sold in large numbers. Consequently, inefficient or less efficient vehicles that are contributing to the loss of the country's energy resources will be slowly removed from the market place. The fuel economy label is a tool that promotes the distributions of more energy efficient vehicles upwards by presenting sufficient information for the potential buyer to help them for making wise decisions and motivate manufacturers to produce vehicles with higher ratings. The present study shows that implementing fuel economy label is one of the most promising strategies to reduce fuel consumption growth in the future. Apart from consumers, fuel economy label also provide great benefits to the national economy, natural environment and local manufacture. As the largest car producer in ASEAN, Malaysia should be a front-runner for high efficient motor vehicles and should implement the fuel economy label as soon as possible. This is the time for the policy makers and energy planner to consider the programs as the top priority to gain an optimum energy, economic and environmental impact.

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